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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/523,749 | 08/22/2005 | Chiaki Suyama | 06920/0202496-US0 | 7711 |

7278 7590 10/26/2007

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| EXAMINER | |
|---|---|
| SEIFU, LESSANEWORK T | |
| **ART UNIT** | **PAPER NUMBER** |
| 1797 | |
| **MAIL DATE** | **DELIVERY MODE** |
| 10/26/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/523,749 | SUYAMA ET AL. | |
| | Examiner | Art Unit | |
| | Lessanework T. Seifu | 1797 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *03 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *9-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8, 19, and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *02/03/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-8, 19 and 20, drawn to a method of upgrading a biomass.

Group II, claim(s) 9-18, drawn to a method of producing a biomass water slurry.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The technical feature in invention I is a method of upgrading a biomass to increase its heat value on combustion. The technical feature in invention II is a method of producing biomass water slurry. The special technical feature linking the two groups of inventions is the step of performing upgrading treatment of a cellulose base biomass in presence of water and under a pressure of at least saturated water vapor pressure. This technical feature does not make a contribution over the prior art, because the technical feature is already known in the prior art as evidenced by the reference Catallo et al. (US 6,180,845). Catallo et al. disclose a method of transforming (upgrading)

biomass to hydrocarbon mixtures in presence of water under a pressure of near-critical or supercritical water, which corresponds to applicants' biomass treatment "in presence of water and under pressure of at least saturated water vapor pressure" (see Abstract).

3. During a telephone conversation with Peter Ludwig on October 12, 2007 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-8, 19, and 20. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-18 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 6, and 8 are rejected under 35 U.S.C. 102(b) as anticipated by Catallo et al. (US 6,180,845).

Regarding claims 1 and 4, Catallo et al. disclose a process for converting organic compounds including cellulose base biomass, which encompasses applicants' "cellulose based biomass with an oxygen/carbon atomic ratio of at least 0.5", into hydrocarbon mixture in presence of water under supercritical or near-critical condition

(see col. 2, lines 5-22). The above disclosure reads on applicants' upgrading treatment being performed "in presence of water and under pressure of at least saturated water vapor pressure". Regarding the limitation of reducing the oxygen/carbon atomic ratio to no more than 0.38 which reads on zero oxygen being present, Catallo et al. disclose that their process convert biomass to hydrocarbon mixture, which implies the mixture being free of oxygen (see col. 4, lines 50-63).

Regarding claim 2, Catallo et al. disclose that the biomass conversion process is conducted at temperature greater than about $320^0$ C and reaction time of one to eight hours. The above disclosure meets the recited limitations in claim 2 (see col. 1, lines 5-22 and col. 3, lines 12-13)).

Regarding claim 3, Catallo et al. disclose that the starting materials for their process include biomass from plants including byproducts of paper and wood industry manufacturing, cellulose and lignin by-products, leaves and grass clippings (see col. 2, lines 25-34).

Regarding claim 5, Catallo et al. disclose starting materials being homogenized before treatment to facilitate the generation of desirable volatile materials (see col. 4, lines 31-35). Catallo et al. further disclose that the organic compounds are reacted with water in near-critical or supercritical aqueous phases (see col. 2, lines 13-24). The above disclosure meets the recited limitations in claim 5.

Regarding claim 6, Catallo et al. disclose that the reaction products from cellulose based biomass treated according to the process in their disclosure were petroleum-like liquid, volatile gases and particulate residue, which can be construed as applicants' upgraded biomass (see col. 6, lines 15-30).

Regarding claim 8, Catallo et al. disclose that biomass conversion process of their invention produced 60 % or more volatile and semivolatile hydrocarbons (see col. 5, lines 38-44).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Catallo et al. (US 6,180,845).

Regarding claim 7, Catallo et al. disclose that the reaction products from cellulose based biomass treated according to the process in their disclosure were petroleum-like liquid, volatile gases and particulate residue, which can be construed as applicants' upgraded biomass (see col. 6, lines 15-30). The reference further discloses that the reaction products from cellulose were particularly high in phenol, C1 and C2-substituted phenols, C2 to C4-sbstituted benzenes, cyclopentanone, and C1-substituted naphthalenes. Catallo et al. however do not disclose the hydrocarbon mixtures produced by their process having the heat value on combustion as recited in claim 7. Since no distinction can be made in the method of treating biomass in the reference Catallo et al. and this instant application, one of ordinary skill in the art would expect the

hydrocarbon mixture produced by the process of Catallo et al. to possess heat value on combustion in the range as recited in claim 7.

10. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Catallo et al. (US 6,180,845) as applied to claim 6 above, and further in view of White (US 3,698,881).

Regarding claims 19 and 20, as shown in claim 6 rejection above, Catallo et al. disclose reaction products from treatment of cellulose that are petroleum-like liquid, volatile gases and particulate residue, which can be construed as applicants' upgraded biomass. Catallo et al. however do not disclose a method of gasifying the reaction products.

The reference White discloses a method of gasifying gaseous hydrocarbons or liquid or solid hydrocarbons to produce synthesis gas comprising hydrogen and carbon monoxide. The reference discloses gasification conditions including temperature in the range of $1200^0$ F to $3200^0$ F, pressure in the range from atmospheric to 450 psig, gasifying agent comprising oxygen in quantity insufficient for complete combustion and steam to produce the desired synthesis gas (see col. 2, lines 7-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the gasification method disclose in the reference

White to gasify the reaction products of Catallo et al. to produce synthesis gas for a number of uses.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lessanework T. Seifu whose telephone number is 571-270-3153. The examiner can normally be reached on Mon-Thr 7:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LS

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